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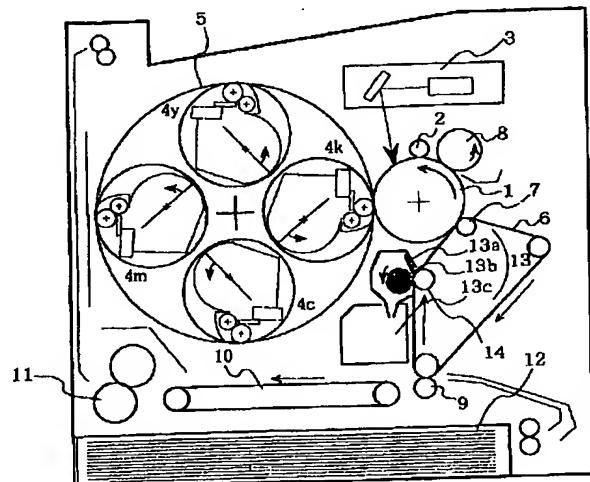
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(54)【発明の名称】 カラー画像形成装置

(57)【要約】

【解決すべき課題】像担持体に形成したトナー像を中間転写体に重畠転写(一次転写)し、この重畠トナー像を転写材に転写(二次転写)するように構成したカラー画像形成装置において、複数個所で発生する廃トナーを1ヶ所に集約処理する。

【解決手段】像担持体で発生した廃トナーを一時的に保持する保持手段と、転写体に発生した廃トナーをクリーニングする手段と、前記保持手段に保持した廃トナーを像担持体を経て中間転写体に逆転写させる手段を設ける。



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【特許請求の範囲】

【請求項1】複数の色信号に応じて各色画像を像担持体に順次形成し、これら色画像を中間転写体に重疊転写してカラー画像を形成するカラー画像形成装置において、前記像担持体に残る残留トナーを一時的に回収保持するトナー保持手段と、前記中間転写体上の残留トナーを回収するクリーニング手段と、前記トナー保持手段に回収したトナーを前記像担持体を介して前記中間転写体に付与した後、このトナーを前記クリーニング手段によって回収する回収手段を具備することを特徴とするカラー画像形成装置。
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【請求項2】各色ごとに像担持体、帯電、露光、現像、トナー保持手段を有し、タンデム型に配置されていることを特徴とする「請求項1」記載のカラー画像形成装置。

【請求項3】前記トナー保持手段が、像担持体と接触乃至近接する回収ローラと、該ローラと像担持体との間に回収バイアスを印加する回収バイアス印加手段とからなり、像担持体表面電位と前記回収バイアス印加手段の印加電位を制御することによって、像担持体からのトナーの回収、像担持体へのトナーの逆転写を行うことを特徴とする「請求項1」または「請求項2」のいずれか記載のカラー画像形成装置。
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【請求項4】トナー回収ローラの体積抵抗が $10^4 \sim 10^{10} \Omega \text{ cm}$ である弹性材からなり、像担持体に接触することを特徴とする「請求項3」記載のカラー画像形成装置。

【請求項5】前記中間転写体のクリーニング手段は、回収ローラと、該ローラに当接して回収した廃トナーを除去するクリーニングブレードと、廃トナー貯溜部とを具備するクリーナカートリッジと、前記回収ローラと前記中間転写体との間に回収バイアスを印加する回収バイアス印加手段とからなることを特徴とする「請求項1」乃至「請求項4」のいずれか記載のカラー画像形成装置。
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【請求項6】前記クリーナカートリッジが画像形成装置本体に着脱自在であることを特徴とする「請求項5」記載のカラー画像形成装置及びクリーナカートリッジ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は静電複写機、同プリンタなど、静電転写プロセスを利用するカラー画像形成装置に関するものである。

【従来技術】

【0002】この種の画像形成装置として従来からよく知られているカラー画像形成装置、とくに中間転写体を具備する画像形成装置について以下「図3」、「図4」によって略述する。「図3」について説明すると、装置本体内には、紙面に垂直方向に軸線を有し、図示矢印方向に回転走行する円筒状の像担持体25が配置してあ
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り、その図示左側に現像装置29が、図示右側に中間転写体たる転写ベルト30が配設してある。

【0003】前記現像装置29は前記像担持体25に近接して平行に回転自在に配置しており、内部に夫々イエロートナー、マゼンタトナー、シアントナー、ブラックトナーを収納する現像器4y、4m、4c、4kを円周方向に設けてある。各現像器は後述する画像形成時に、所定の現像器が前記像担持体25に近接する現像部位に到来して現像を行いうものとする。

【0004】前記転写ベルト30は、図示の場合、4個のローラにわたって懸架しており、これらローラの内の1個のローラ31は一次転写ローラとして、図示のように像担持体25に近接する位置をとって一次転写部位を形成しており、後述する画像形成時に転写バイアスが印加されて転写作用を奏する。また、ローラ34は二次転写ローラとして後述するように転写材にトナー像を転写する二次転写作用を奏するものとする。

【0005】像担持体25表面感光層が一次帶電器26によって一様に帶電され、この帶電面に、原稿のイエロー成分色による画像信号がレーザスキャナ27から投射されて静電潜像が形成される。

【0006】この静電潜像が、像担持体25の回転とともに前記現像部位に達すると、このときまでに現像器4yがこの位置に到来しており、該現像器からイエロートナーが前記潜像に付与されてイエロートナー像として顕像化される。

【0007】このイエロートナー像が、像担持体25の回転にともなって前記一次転写部位に達すると、転写ローラ31に転写バイアスが印加され、よって形成される電界の作用で像担持体上のイエロートナー像は転写ベルト30に転移(転写)する。その後、転写に寄与せず像担持体上に残る残りイエロートナーはクリーニングブレード32によって除去されて像担持体25は次の画像形成動作に入り得る状態になる。

【0008】次いで、上記と同様の操作が引き続き行われ、原稿のマゼンタ、シアン、ブラック各成分色の画像信号によって順次マゼンタトナー像、シアントナー像、ブラックトナー像の形成、引き続きこれらトナー像の転写ベルト30への重疊転写が行われて、すべての転写作業が終了する。

【0009】転写が終了して転写ベルト30とともに走行する多色トナー像が、転写ローラ34を具備する前記二次転写部位に達すると、給紙ローラ33によって、転写ベルト上のトナー像とタイミングを合わせて前記二次転写部位に転写材38が供給されるとともに前記転写ローラ34に二次転写バイアスが印加されて転写ベルト上の多色トナー像は転写材38に転写される。この時転写材38に転移せず転写ベルト30に残る残りトナーはクリーナの位置に至ってクリーニングブラシ35によって除去されるものとする。

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【0010】その後、トナー像を担持した転写材38は転写ベルト30から分離され、搬送路36を経て定着装置37に至り、ここで加熱、加圧されてトナー像が融解、混色してカラー画像となり、転写材に定着固定された後機外に排出される。

【0011】このような画像形成装置においては、トナーハーの補充、廃トナーの処理、帶電器、像担持体の保守、交換等のメンテナンスが必要となるので、図示の装置では、像担持体25、一次帶電器26、クリーニングブレード32を含むクリーニング手段を一体としてプロセスカートリッジ39に構成して画像形成装置本体に対して着脱自在に構成し、また現像器4y、4m、4c、4kを包含する現像装置29も現像プロセスカートリッジとして本体に対して着脱自在に構成してあるものとする。

【0012】前記カートリッジ39においては、クリーニングブレード32によって回収した廃トナーを収納するためにクリーニング手段には廃トナー容器40が形成してあり、これが満杯となった時点でカートリッジ39を交換する。現像プロセスカートリッジも内装する現像器のトナーが無くなったときにこれを交換する。このようなカートリッジ構成とすることによって日常的なメンテナンスはユーザが簡単に実施できて作業効率の向上に資することは容易に理解できるところであろう。

【0013】「図4」は、他の構成を具有するカラー画像形成装置の例を示す概略側面図である。この装置では、適数のローラに懸架されて走行する、中間転写体たる転写ベルト45に対向配置され、像担持体41y、一次帶電器42y、静電潜像形成のための画像信号付与手段43y、イエロートナーを収納する現像器44y、クリーニングブレード47y、前記像担持体に対向して転写ベルトの反対側に設けた一次転写ローラ46yからなる画像形成部P1と、夫々該画像形成部P1と同様の像担持体41m、41c、41k、一次帶電器42m、42c、42k、画像信号付与手段43m、43c、43k、クリーニングブレード47m、47c、47k、一次転写ローラ46m、46c、46k並びにそれぞれマゼンタトナー、シアントナー、ブラックトナーを収納する現像器44m、44c、44kを有する画像形成部P2、P3、P4とが前記転写ベルト45の進行方向に対して直列状に配置してある。

【0014】転写ベルト45が各画像形成部P1乃至P4に沿って走行するにつれて、該ベルト上所定位置にイエロートナー像、マゼンタトナー像、シアントナー像、ブラックトナー像が重疊形成されてベルト45とともに走行する。このトナー像が転写ベルト45に組み込まれた二次転写ローラ34の位置に到来すると、このトナー像にタイミングを合わせて、給紙ローラ33を経て転写材38が転写ローラ34のある転写位置に搬送されるとともに、転写バイアスが印加されて転写ベルト上の多色トナー像が転写材38に転写される。

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【0015】その後、転写材38は搬送路30を経て定着装置37に搬送され、加熱、加圧作用を受けてトナー像がカラー画像となって転写材に定着固定された後機外に排出される。転写ベルト45に残る残留トナーはクリーニング装置のブラシ35によって除去されるものとする。

【0016】以上説明したような、中間転写体（「図3」におけるベルト30、「図4」におけるベルト45）を用いる画像形成装置においては、装置本体内の別異の場所にある、像担持体上の残留トナー、中間転写体上の残留トナーの双方を処理する必要があるため、メンテナンス上の負担が大きく、とくに前記「図4」に示す装置では各画像形成部で残留トナーが発生するので負担はより大きくならざるを得ない。

【0017】

【発明が解決しようとする課題】このような問題を解決する手段として、各部で発生する廃トナーを搬送手段によって1個所に集中して処理することが考えられるが、搬送手段における充分なトナー洩れ対策が必要となり、そのための特段の機構、スペースが必要となってコストアップを免れない。

【0018】他の手段として、残留トナーを現像器に返戻して再利用することによって実質的に廃トナーを無くすことが考えられるが、このような仕方が前述のようなカラー画像形成装置の、特に二次転写による残留トナーでは異色のトナーの混在の問題がある以上実質的に実現不可能であることは直ちに理解できるところであろう。

【0019】結局、トナー再利用による廃トナー処理は、一次転写後のトナー処理の場合に限られることになるが、この場合にも、廃トナーに含まれている紙粉、塵埃、装置内高圧部材の存在による析出物、外添剤などの選択転写による配合比の変化等によるトナーの劣化の問題が存在するために満足のゆくような結果は得られない。

【0020】前記「図3」に示すような像担持体が1個の装置では、例えば、特開平9-44007号公報にみると、中間転写体の残留トナーを像担持体に静電的に逆転写してこれを像担持体用のクリーニング手段に回収するようなものが提案されている。

【0021】このような手段は、単一の像担持体をそなえた装置では、廃トナーの搬送経路や中間転写体のクリーニング手段を不要とすることができます、像担持体とクリーニング手段とを一体のプロセスカートリッジとすることによる交換の容易性、廃トナーの密封性、メンテナンス性の向上がはかれる等一定の利点がある。

【0022】併しながら、実際には、カラー画像形成装置では、モノクロ画像用の装置に比して、文字、グラフィック、写真など画像の種別の比率が使用状況によって大きく異なり、これによって像担持体の残寿命と、それ以後の廃トナーの収容可能量とに大きな変動が生ずる可

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能性があり、像担持体とクリーニング手段とをカートリッジに形成した場合、像担持体の寿命が充分残っているうちに廃トナー貯溜部位が満杯となってカートリッジを交換しなければならないような事態を惹起することがあった。

【0023】本発明はこのような事態に対処すべくなされたものであって、特段の廃トナー搬送手段を必要とせず、装置全体のクリーニング手段を一つに集約し、さらに像担持体と廃トナー貯溜部とを分化させて廃トナーの簡単な処理を可能とするとともに、とくに内部機構をカートリッジ化した場合、廃トナー処理部位の寿命と、カートリッジを構成する他の部材の寿命との整合性を向上させてコストダウンにも資するようなカラー画像形成装置を提供することを目的とするものである。

【0024】

【課題を解決する技術手段、その作用】上記の目的を達成するため、本発明は、複数の色信号に応じて各色画像を像担持体に順次形成し、これら色画像を中間転写体に重畠転写してカラー画像を形成するカラー画像形成装置において、前記像担持体に残る残留トナーを一時的に回収保持するトナー保持手段と、前記中間転写体上の残留トナーを回収するクリーニング手段と、前記トナー保持手段に回収したトナーを前記像担持体を介して前記中間転写体に付与した後、このトナーを前記クリーニング手段によって回収する回収手段を具備することを特徴とするカラー画像形成装置(1)、または、上記(1)のものにおいて、像担持体、帯電、露光、現像、トナー保持手段が各色トナー毎に各別にタンデム型に配置されていることを特徴とするカラー画像形成装置(2)、または、上記(1)または(2)のものにおいて、前記トナー保持手段が、像担持体と接触乃至近接する回収ローラと、該ローラと像担持体との間に回収バイアスを印加する回収バイアス印加手段とからなり、像担持体表面電位と前記回収バイアス印加手段の印加電位を制御することによって、像担持体からのトナーの回収、像担持体へのトナーの逆転写を行うことを特徴とするカラー画像形成装置(3)、または、上記(3)のものにおいて、トナー回収ローラの体積抵抗が $10^4 \sim 10^{10} \Omega \text{ cm}$ である弾性材からなり、像担持体に接触することを特徴とするカラー画像形成装置(4)、または、上記(1)乃至(4)のいずれかのものにおいて、前記中間転写体のクリーニング手段は、回収ローラと、該ローラに当接して回収した廃トナーを除去するクリーニングブレードと、廃トナー貯溜部とを具備するクリーナカートリッジと、前記回収ローラと前記中間転写体との間に回収バイアスを印加する回収バイアス印加手段とからなることを特徴とするカラー画像形成装置(5)、または、上記(5)のものにおいて、前記クリーナカートリッジが画像形成装置本体に着脱自在であることを特徴とするカラー画像形成装置及びクリーナカートリッジ(6)である。

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【0025】このように構成することによって、画像形成装置の進展によって増大する傾向のある廃トナーの処理を簡略化するとともに、とくにプロセスカートリッジに構成する場合、廃トナー処理部位の寿命と他の部材のそれとの整合が取れ易く、全体としてコストダウンに極めて有効である。

【0026】

【実施例の説明】「図1」は本発明の第1の実施例を示すカラー画像形成装置の側断面図で、装置本体内には紙面に垂直方向に軸線を有して図示矢印方向に回転走行する像担持体1と、これに近接して平行に配置されており、内部にブラックトナー、イエロートナー、マゼンタトナー、シアントナーを夫々収納する現像器4k、4y、4m、4cを内装して、順次前記像担持体に近接する現像部位に移動し得るように回転自在に設けた現像装置5、及び前記像担持体1に近接して、一次転写ローラ7、バックアップローラ14その他のローラにわたって懸架されている中間転写体たる転写ベルト6が配設している。

【0027】像担持体1の図示上方には、これに画像信号を投射するレーザスキャナ3、図示下方には、転写材12を、二次転写ローラ9のある二次転写部位を経て搬送路10から定着装置11に搬送する搬送系が設けてある。

【0028】このカラー画像形成装置の基本的な画像形成工程は前記「図3」に示した装置の場合と同様であるので、とくに変わりのない部分は省略して本発明の特徴的な部分についてのみ以下に説明する。なお、この装置に用いるトナーは、イエロー、マゼンタ、シアントナーは非磁性トナーで、ブラックトナーのみ磁性トナーを用い、また、各トナーとも負帯電性である。

【0029】回転駆動される像担持体1の表面を一様に帯電させる一次帯電器2に印加される帶電バイアスは -500V とした。像担持体1上に形成された静電潜像が該像担持体の回転走行につれて現像部位に達すると、このときまでにブラックトナーを収納した現像器4kが図示の位置に到来しており、これからブラックトナーが前記潜像に供給されてブラックトナー像が形成される。

【0030】このトナー像が進行して、像担持体1と前記転写ベルト6とが当接する転写部位に至ると、該ベルトを介して像担持体1に対向する一次転写ローラ7に転写バイアスが印加されて、像担持体上のブラックトナー像が転写ベルト6に転写される。

【0031】像担持体1の回転方向にみて前記転写部位よりも下流側にはトナー回収用の回収ローラ8が、像担持体1の周速の110%程度の周速で回転しており、該ローラ8に不図示のバイアス印加手段によって回収バイアスが印加されると、前述の転写工程において発生した像担持体1上の残留トナーは前記回収ローラ8に転移して像担持体から除去される。図示の装置の場合、前記回

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収バイアスは直流+150Vとした。

【0032】前記回収ローラ8は、芯金にカーボンブラックを混合したエピクリルヒドリンゴム層を被覆形成し、その表面に厚み約 $10\mu m$ のフルオロオレフィン系のフッ素樹脂を被覆して体積抵抗値 $10^5 \sim 10^6 \Omega cm$ に調整した弾性ゴムローラを用いた。

【0033】前記回収ローラ8に貯溜できる廃トナー量は、印字比率6%程度の文字画像イメージの場合、約100枚、4色カラー画像で約25枚程度の連続通紙に耐えられる。

【0034】回収ローラ8によって残留トナーが除去された像担持体1は、ついで、イエロートナー像の形成、該トナー像の転写ベルト6上の前記ブラックトナー像への重疊転写、回収ローラ8への像担持体1の残留イエロートナーの除去が行われる。引き続き転写ベルト6にはマゼンタトナー像、シアントナー像が前述の先行トナー像に重疊転写され、その都度、発生する残留トナーが回収ローラ8に回収されて転写工程が終了する。

【0035】転写工程を終了した転写ベルト6上の重疊トナー像が、二次転写ローラ9が配置された二次転写部位に達すると、このときまでに転写材12が該転写部位に到来し、ここで転写ベルト6側のトナー像が転写材12に転写(二次転写)される。その後、転写材は転写部位を離れ、搬送路10を経て定着装置11に至って4色トナーが融解混色されてカラー画像となるとともに転写材に定着固定された後、機外に排出される。

【0036】二次転写時に転写材に転移しなかった転写ベルト上の残留トナーはクリーニング手段13の位置に至り、ここでクリーニングブレード13a及びクリーニングブラシ13bによって転写ベルト6から除去されて廃トナー容器13cに落下貯溜され、転写ベルト6は次の転写工程に入り得る状態になる。なお、図示符号14は、クリーニングブレード13aのトナー搔き落とし作用を確保するための裏打ち用ローラである。

【0037】次に前述のクリーニング工程について、さらに説明する。画像形成工程終了後、像担持体1の回転を続けて帶電ローラ2によって像担持体表面を-300Vに帶電させる。現像装置5を像担持体から離隔した不作動位置に持ち來たし、像担持体1の帶電部位が回収ローラ8に達した後該ローラ8に逆転移バイアスとして、-500Vの直流バイアスを印加する。この時転写ベルト6も駆動されているものとする。

【0038】これによって、一次転写時に回収ローラ8によって回収保持されているトナーは像担持体1に転移する。像担持体1に転移したトナーはその後一次転写ローラ7の位置に至り、この転写バイアスの作用で、回収ローラ8から像担持体1側に転移したトナーはさらに転写ベルト6に転移し、最終的にクリーニング手段13によって除去される。

【0039】前記回収ローラ8に保持されていたトナー 50

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は、画像形成工程中に何度か回収バイアスが印加された像担持体1との接触部を何度か通過して充分に帶電しているから逆転写バイアスを印加することによって殆ど全てのトナーを像担持体に転移させることができる。また、回収ローラ8上のトナーは転写ベルトに移動するまでの間に帶電ローラ2と接触し一部のトナーが該帶電ローラ2に付着するが、このトナーは逐次除去されて行くので帶電ローラ2が汚染されるようなことはない。

【0040】また、転写ベルト6に転移したトナーがクリーニング手段13に達するまでに二次転写部位を通過するが、二次転写ローラ9に充分な負のバイアス(通常2KV以上)を印加しておくことによって転写ローラ9の汚染は容易に防止できる。なお、転写ローラ9を退避位置に持ちきたすことができる構成の場合にはクリーニング工程中これを退避させておけばよい。

【0041】回収するトナーが、回収ローラ8に保持できるトナー量以上になるような連続通紙を行う場合には画像形成工程を一時中断してクリーニング工程を実施した後、再度画像形成を行えばよい。クリーニング工程に要する時間は単色画像を1枚印字する時間程度であるので、これによる作業効率の低下は実用上問題にはならない。

【0042】以上説明したように、本装置によれば、中間転写体を具備する画像形成装置において、一次転写、二次転写時に発生する廃トナー処理のためのクリーニング手段を、特段の付帯機構を要することなく一か所に集約できる。

【0043】また、上記の装置における帶電、露光、現像等の手段は上記の装置に示したものに限定されるものではなく、例えば、帶電手段としてはスコトコロン等周知の帶電装置を利用でき、潜像を担持する手段は図示のような像担持体に限らず感光ベルトを用いることも可能である。さらに、クリーニング工程中の帶電、現像、一次転写、二次転写、廃トナー保持手段に印加されるバイアスも前述の値に限定されるものではなく、例えば、画像の色ごとに、或いは画像を重ねる順序ごとにバイアス設定値を変化させることも本発明の範囲内で任意にできることことは云うまでもない。

【0044】「図2」は、本発明の第2の実施例を示す概略側断面図であって、前記「図4」に示す装置と対応する部位には同一の符号を付して示してあり、それらについての説明は省略する。また、符号に差異があつても「図4」の装置から構成、作用について容易に類推できる部位についても特に必要ない限り説明を省略して、以下には主として本発明の特徴的な部分について説明する。

【0045】このカラー画像形成装置は、無端状に展張されて走行する転写ベルト19の、該ベルト走行方向に夫々異色のトナー像を形成する画像形成部P1、P2、P3、P4が直列状に配設してある。各画像形成部は現

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像器に収納するトナーが異色であるだけで、基本的な構成作用には変わりはない。なお、画像品位を高めるために、前述の装置の場合と同様に、黒色トナーには磁性トナーを、その他のカラートナーには非磁性トナーを用いるものとする。

【0046】前記各画像形成部P1乃至P4には夫々像担持体15y、15m15c、15kが、また、転写ベルト19の反対側に各像担持体に対向して一次転写ローラ20y、20m、20c、20kが配置してある。前記各像担持体周辺には、イエロートナーを収納した現像器18y、マゼンタトナーを収納した現像器18m、シアントナーを収納した現像器18c、ブラックトナーを収納した現像器18k：帶電ローラ16y、16m、16c、16k、並びに転写残トナー回収ローラ22y、22m、22c、22kがそれぞれ配設してある。図示の装置において、帶電ローラ16yなどに印加される帶電バイアスは直流に交流を重畠したもので、これによって像担持体15yなど表面電位が-500Vとなるようにしてある。

【0047】画像形成工程について略述する。原稿のイエロー成分色による画像信号がレーザスキヤナ17yから、一次帶電器16yによって一様に帶電された像担持体15yに投射されて静電潜像が形成され、これに現像器18yからイエロートナーが供給されてイエロートナー像となり、このイエロートナー像が、一次転写ローラ20yの作用で、転写ベルト19に転写され、該ベルト19とともに画像形成部P2方向に進行する。

【0048】このイエロートナー像が画像形成部P2に達する迄に、上記と同様に、レーザスキヤナ17mから像担持体15mに投射されたマゼンタ成分色による画像信号によって、マゼンタトナーによるマゼンタトナー像が像担持体15m上に形成され、このマゼンタトナー像が転写ベルト19上の前記イエロートナー像に重畠転写され、この重畠トナー像が画像形成部P3方向に進行する。

【0049】同様に、レーザスキヤナ17c、17kから夫々像担持体15c、15kに投射された画像信号によって形成されたシアントナー像、ブラックトナー像が、転写ベルト19上の前記トナー像にさらに重畠転写されて転写工程が終了する。

【0050】その後転写ベルト19の走行に伴って前記重畠トナー像が、二次転写ローラ21が配置された二次転写部位に至ると、このとき迄に、カセット等から取り出された転写材12が前記二次転写部位に供給され、これとともに二次転写バイアスが転写ローラ21に印加され、よって形成される電界の作用で転写ベルト19上のトナー像が転写材12に転移（転写）する。

【0051】トナー像を受容した転写材は転写ベルト19から分離され、搬送路10によつ定着装置11搬送され、ここで加熱、加圧されてトナー像は融解、混色して

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カラー画像となって転写材12に定着固定された後、機外に排出される。

【0052】上記構成の画像形成装置において、各像担持体15y等には一次転写の際に各像担持体上に残留トナーが発生し、また、転写ベルト19から転写材に転写する二次転写の際にも該転写ベルト上には残留トナーが発生する。

【0053】次に、上記残留トナーの処理について説明する。なお、各画像形成部の構成は同一であるので、以下画像形成部P1についてのみ説明する。像担持体15yに当接して回転している残留トナー回収ローラ22yに該像担持体15y上の残留トナーを回収する。

【0054】回収ローラ22yとしては前記実施例装置の場合と同様のものを用いる。また、該ローラ22yの周速も前記実施例装置と同様像担持体15yの周速に対して約110%の周速とし、印加する回収バイアスは+150Vとした。これによる残留トナーの回収ローラ22yへの回収量も6%印字率で連続印字して約100枚程度である。

【0055】回収ローラ22yによって残留トナーが回収除去されて、像担持体15yは次の画像形成工程に入り得る状態になる。また、像担持体15m、15c、15kに対しても同様の仕方で残留トナーが回収ローラ22m、22c、22kに夫々回収されるものとする。

【0056】また、転写ベルト19を支持する前記二次転写部位よりも下流側に位置するテンションローラ24に対向する部位にクリーニング装置23が配置してある。該クリーニング装置は転写ベルト19に当接する回収ローラ23aと、このローラからトナーをかき落とすためのクリーニングブレード23b、かき落とした廃トナーを収容する貯溜部23cを具備しており、全体として一体のカートリッジに形成されていて、画像形成装置本体に対して着脱自在となっている。

【0057】前記回収ローラ23aは前記テンションローラ24にバックアップされる位置にあって、アルミニウム上にカーボンを分散して体積抵抗値を $10^9 \sim 10^{10} \Omega \text{ cm}$ に調整したポリカーボネート樹脂層を被覆構成したもので、転写ベルト19に当接してこれと同期走行し、これに+500Vの直流電圧に振幅2Kvの正弦波を重畠した電圧を回収電圧として印加する。

【0058】クリーニングブレード23bは板金からなる支持部材に取り付けたウレタンゴムからなり前記回収ローラ23aに対してカウンタ方向に当接しており、前記回収ローラ23aに回収された廃トナーをかき取って貯溜部23cに落下収容する。

【0059】クリーニング工程について説明する。なお、クリーニング工程は各画像形成部において同様の操作が行われているので、以下の説明においては、各部の符号に付したサフィックスは省略する。前述の画像形成工程が終了した後、各帶電ローラ16で像担持体15の

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表面電位を-300Vに帯電する。露光、現像は行わず、現像器18には逆転写された残留トナーが混入しないように-500Vの直流バイアスを印加し、一次転写ローラ20には一次転写バイアスを印加する。

【0060】像担持体15上の-300Vに帶電した部分が回収ローラ22との当接部位に達した後、該ローラ22に-500vの逆転写バイアスを印加する。これによって回収ローラ22に回収保持されていたトナーは像担持体15に逆転写される。この逆転写されたトナーは像担持体15によって搬送されて一次転写バイアスによって転写ベルト19に転写され、前記クリーニング手段23まで搬送されてここで該ベルト19から除去されるものとする。

【0061】前記回収ローラ22に保持しきれない程連続通紙が行われるような場合には、画像形成工程を一時停止してクリーニング工程を実行してから再度画像形成工程に入るようすればよい。なお、この実施例装置では、各回収ローラには夫々单一の色トナーしか回収されないので、前述の実施例装置よりも多量の連続通紙に耐えられる利点がある。

【0062】前記クリーニング装置23の回収ローラ23aは、前述のものに限らず、例えば、アルミシリンダ上に体積抵抗値 10^{13} Ω cm程度のポリカーボネート樹脂層を形成し、表層に過剰の電荷が蓄積しないように、クリーニングブレードの下流側に除電手段を設けてよい。また、転写ベルト19は、絶縁性が信頼できるものであれば、回収ローラ23aは適宜の金属シリンダでもよい。

【0063】以上のようにこの実施例装置によれば、複数個所で発生する廃トナーを1ヶ所に集約処理でき、とくにクリーニング部をカートリッジ化することによって廃トナー処理を極めて簡便にすることができる。

【発明の効果】以上説明したように、本発明によるととき

は、各色信号に応じた色画像を中間転写体に一次転写した後、これを転写材に二次転写するように構成したカラーワード形成装置において、一次転写後の像担持体上の残留トナーを一時的に回収保持する残留トナー保持手段と、二次転写の中間転写体の残留トナーを除去するクリーニング手段と、前記残留トナー保持手段に回収されたトナーを前記中間転写体を経て前記クリーニング手段に回収するようにしたから、複数個所で発生する残留トナーを特段複雑な機構を必要とすることなく1ヶ所に集約でき、像担持体を含むワード形成部と廃トナー処理部との分化が可能となり、廃トナーの処理の簡便さの実現に顕著な効果があり、また、クリーニング手段と他の部材とをカートリッジに形成する場合、両者の寿命の整合性が図り易く、コストダウンに資するところも大である。

【図面の簡単な説明】

【図1】 本発明の実施例たるカラー画像形成装置の概略側断面図

【図2】 他の実施例たるカラー画像形成装置の概略側断面図

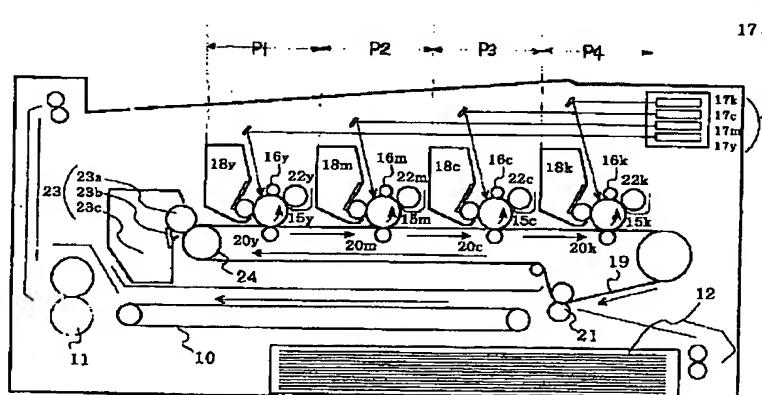
【図3】 公知のカラー画像形成装置の一例を示す概略側断面図

【図4】 公知のカラー画像形成装置の他の例を示す概略側断面図

【符号の説明】

1、15	像担持体
2、16	帶電ローラ
5、18	現像装置
6、19	転写ベルト（中間転写体）
7、20	一次転写ローラ
8、22	回収ローラ
9、21	二次転写ローラ
13、23	クリーニング装置

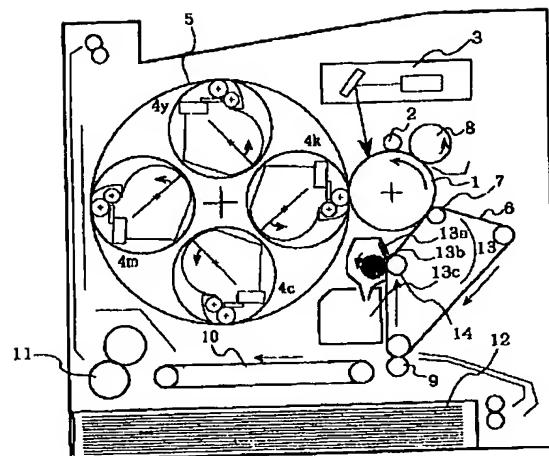
【圖 8】



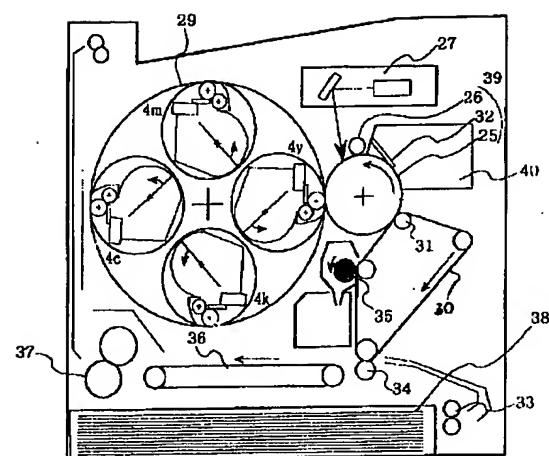
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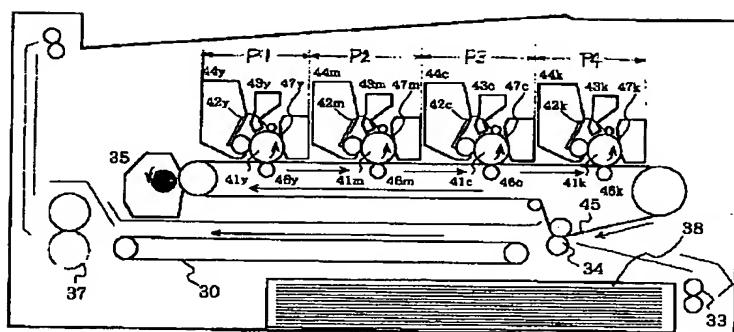
【図1】



【図3】



【図4】



COLOR IMAGE FORMING DEVICE

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Applicant(s): CANON INC

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Equivalents:

Abstract

PROBLEM TO BE SOLVED: To gather discharged toner generated in plural places at one place and to treat the discharged toner by providing a recovering means for imparting the toner recovered in a toner holding means to an intermediate transfer body through an image carrier, and thereafter, recovering the toner by a cleaning means.

SOLUTION: On the downstream side of a transfer part in the rotating direction of the image carrier 1 a toner recovering roller 8 is rotated at a circumferential speed as about 110% of that of the image carrier 1. When a recovering bias is impressed on the roller 8 by a bias impressing means, the residual toner which is generated at the transfer process and remains on the image carrier 1 is transferred to the recovering roller 8 so as to be removed from the image carrier 1. And, the toner recovered and held by the recovering roller 8 at a primary transfer time is transferred to the image carrier 1. The toner transferred to the image carrier 1 reaches the primary transfer roller 7, thereafter, the toner is transferred to a transfer belt 6, and finally removed by the cleaning means 13.

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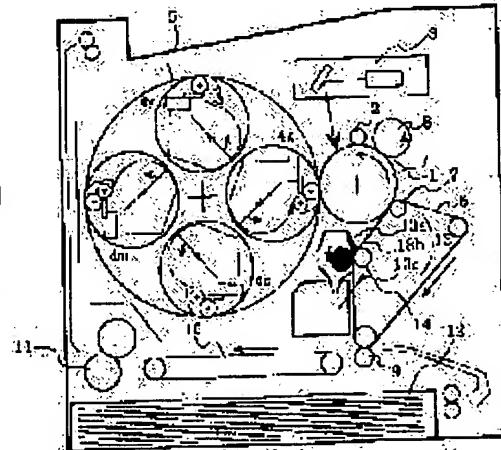
(22)Date of filing : 08.07.1998 (72)Inventor : OSHIMA MASAKI

(54) COLOR IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To gather discharged toner generated in plural places at one place and to treat the discharged toner by providing a recovering means for imparting the toner recovered in a toner holding means to an intermediate transfer body through an image carrier, and thereafter, recovering the toner by a cleaning means.

SOLUTION: On the downstream side of a transfer part in the rotating direction of the image carrier 1 a toner recovering roller 8 is rotated at a circumferential speed as about 110% of that of the image carrier 1. When a recovering bias is impressed on the roller 8 by a bias impressing means, the residual toner which is generated at the transfer process and remains on the image carrier 1 is transferred to the recovering roller 8 so as to be removed from the image carrier 1. And, the toner recovered and held by the recovering roller 8 at a primary transfer time is transferred to the image carrier 1. The toner transferred to the image carrier 1 reaches the primary transfer roller 7, thereafter, the toner is transferred to a transfer belt 6, and finally removed by the cleaning means 13.



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CLAIMS

[Claim(s)]

[Claim 1] Color picture formation equipment which is characterized by providing the following and which carries out sequential formation of each color image at image support according to two or more chrominance signals, carries out the superposition imprint of these color image at a middle imprint object, and forms a color picture A toner maintenance means which carries out recovery maintenance of the residual toner which remains in said image support temporarily A cleaning means to collect residual toners on said middle imprint object A recovery means by which said cleaning means recovers this toner after giving a toner collected for said toner maintenance means to said middle imprint object through said image support

[Claim 2] Color picture formation equipment given in "claim 1" characterized by having image support, electrification, exposure, development, and a toner maintenance means for every color, and being arranged at a tandem die.

[Claim 3] "Claim 1" or "claim 2" characterized by performing recovery of a toner from image support and reverse transcription of a toner to image support is color picture formation equipment of a publication either by having the following and controlling image support surface potential and impression potential of said recovery bias impression means. A recovery roller with which said toner maintenance means contacts thru/or approaches with image support A recovery bias impression means to impress recovery bias between this roller and image support

[Claim 4] Color picture formation equipment given in "claim 3" characterized by for a volume resistivity of a toner recovery roller consisting of elastic material which is 104-1010-ohmcm, and contacting image support.

[Claim 5] For a cleaning means of said middle imprint object, "claim 1" characterized by to consist of a recovery bias impression means impress recovery bias between a cleaner cartridge possessing a recovery roller, a cleaning blade which removes a waste toner collected in contact with this roller, and a waste toner reservoir, and said recovery roller and said middle imprint object thru/or "claim 4" are color-picture formation equipment of a publication either.

[Claim 6] Color picture formation equipment and a cleaner cartridge given in "claim 5" which are characterized by the ability of said cleaner cartridge to detach and attach freely on a main part of image formation equipment.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to color picture formation equipments using an electrostatic image transfer process, such as an electrostatic process copying machine and this printer.

[Description of the Prior Art]

[0002] It sketches by " drawing 3 " and " drawing 4 " below from the former as this kind of image formation equipment about the color picture formation equipment known well, especially the image formation equipment possessing a middle imprint object. If " drawing 3 " is explained, in the main part of equipment, it has an axis perpendicularly in space and the image support 25 of the shape of a cylinder which carries out rotation transit is arranged in the direction of an illustration arrow head, a developer 29 arranges in the illustration left-hand side, and the middle imprint object slack imprint belt 30 is arranged in illustration right-hand side.

[0003] Said developer 29 approaches said image support 25, is arranged free [rotation] in parallel, and has formed the development counters 4y, 4m, 4c, and 4k which contain a yellow toner, a Magenta toner, a cyanogen toner, and a black toner inside, respectively in the circumferencial direction. At the time of the image formation mentioned later, each development counter shall develop negatives by arriving at the development part to which a predetermined development counter approaches said image support 25.

[0004] In illustration, the suspension of said imprint belt 30 has been carried out over four rollers, one roller 31 in these rollers takes the location which approaches the image support 25 like illustration as a primary imprint roller, and forms the primary imprint part, imprint bias is impressed at the time of the image formation mentioned later, and it does an imprint operation so. Moreover, a roller 34 shall do so the secondary imprint operation which imprints a toner image to imprint material so that it may mention later as a secondary imprint roller.

[0005] An image support 25 surface sensitization layer is uniformly charged with the primary electrification vessel 26, it is projected on the picture signal in the yellow component color of a manuscript from the laser scanner 27, and an electrostatic latent image is formed in this electrification side.

[0006] If this electrostatic latent image arrives at said development part with rotation of the image support 25, development counter 4y will have arrived at this location by this time, a yellow toner will be given to said latent image from this development counter, and it will develop as a yellow toner image.

[0007] If this yellow toner image arrives at said primary imprint part with rotation of the image support 25, imprint bias will be impressed to the imprint roller 31, and the yellow toner image on image support will be transferred to the imprint belt 30 in an operation of the electric field therefore formed (imprint). Then, the residual yellow toner which does not contribute to an imprint but remains on image support is removed by the cleaning blade 32, and the image support 25 will be in the condition that the next image formation actuation can be started.

[0008] Subsequently, the same actuation as the above is performed succeedingly, by the picture signal of

the Magenta of a manuscript, cyanogen, and black each component color, it forms, a Magenta toner image, a cyanogen toner image, and a black toner image continue, the superposition imprint to the imprint belt 30 of these toner image is performed one by one, and all imprint is completed.

[0009] If the multicolor toner image an imprint ends and it runs with the imprint belt 30 arrives at said secondary imprint part possessing the imprint roller 34, while doubling the toner image and timing on an imprint belt and supplying the imprint material 38 to said secondary imprint part with the feed roller 33, secondary imprint bias will be impressed to said imprint-RA 34, and the multicolor toner image on an imprint belt will be imprinted by the imprint material 38. The residual toner which does not transfer to the imprint material 38 at this time, but remains in the imprint belt 30 shall be removed very much by the cleaning brush 35 in the location of a cleaner.

[0010] Then, it dissociates from the imprint belt 30, the imprint material 38 which supported the toner image results in an anchorage device 37 through the conveyance way 36, and it is heated and pressurized here, and a toner image is discharged outside the plane, after having carried out color mixture, becoming a color picture and carrying out fixing immobilization at imprint material, fusion and.

[0011] Since the maintenance of maintenance of a supplement of a toner, processing of a waste toner, an electrification machine, and image support, exchange, etc. is needed, in such image formation equipment with the equipment of illustration Constitute in a process cartridge 39 by making the image support 25, the primary electrification machine 26, and the cleaning means containing cleaning BURETO 32 into one, and it constitutes free [attachment and detachment] to the main part of image formation equipment. Moreover, the developer 29 which includes development counters 4y, 4m, 4c, and 4k shall also be constituted free [attachment and detachment] to the main part as a development process cartridge.

[0012] In said cartridge 39, in order to contain the waste toner collected by the cleaning blade 32, the waste toner bottle 40 is formed in the cleaning means, and when this becomes full, a cartridge 39 is exchanged. These is exchanged when the toner of the development counter which carries out the interior also of the development process cartridge is lost. It can just be going to be understood by considering as such a cartridge configuration easily for a user to be able to carry out an everyday maintenance easily and to ** to improvement in working efficiency.

[0013] "Drawing 4" is the outline side elevation showing the example of the color picture formation equipment possessing other configurations. Opposite arrangement is carried out at the middle imprint object slack imprint belt 45 it runs by carrying out suspension to an adequate several roller with this equipment. Picture signal grant means 43y for image support 41y, primary electrification machine 42y, and electrostatic latent-image formation, The image formation section P1 which consists of development counter 44y which contains a yellow toner, cleaning-blade 47y, and primary imprint roller 46y which countered said image support and was prepared in the opposite side of an imprint belt, The respectively same image support 41m, 41c, and 41k as this image formation section P1, 42m of primary electrification machines, 42c, 42k, the picture signal grant means 43m, 43c, and 43k, cleaning-blade 47m, In 47c, 47k, the primary imprint rollers 46m and 46c, and 46k list, respectively A Magenta toner, The image formation sections P2, P3, and P4 which have the development counters 44m, 44c, and 44k which contain a cyanogen toner and a black toner are arranged in the shape of a serial to the travelling direction of said imprint belt 45.

[0014] Superposition formation of a yellow toner image, a Magenta toner image, a cyanogen toner image, and the black toner image is carried out in this belt top predetermined location, and it runs with a belt 45 as the imprint belt 45 runs along with each image formation section P1 thru/or P4. If this toner image arrives at the location of the secondary imprint roller 34 built into the imprint belt 45, timing is doubled with this toner image, while the imprint material 38 is conveyed through the feed roller 33 in an imprint location with the imprint roller 34, imprint bias will be impressed and the multicolor toner image on an imprint belt will be imprinted by the imprint material 38.

[0015] Then, the imprint material 38 is conveyed by the anchorage device 37 through the conveyance way 30, and after a toner image turns into a color picture in response to heating and a pressurization operation and fixing immobilization is carried out at imprint material, it is discharged outside the plane.

The residual toner which remains in the imprint belt 45 shall be removed by the brush 35 of cleaning equipment.

[0016] In the image formation equipment using a middle imprint object (the belt 30 in " drawing 3 ", belt 45 in " drawing 4 ") which was explained above Since it is necessary to process the both sides of the residual toner on image support in the location of another ** within the main part of equipment, and the residual toner on a middle imprint object, The burden on a maintenance is large, and with the equipment shown especially in the above " drawing 4 ", since a residual toner is generated in each image formation section, a burden cannot but become larger.

[0017]

[Problem(s) to be Solved by the Invention] Although it is possible to concentrate on one place and to process the waste toner generated in each part with a conveyance means as a means to solve such a problem, sufficient cure against a toner leak in a conveyance means is needed, the device special [for it], and a space are needed, and a cost rise is not escaped.

[0018] Although it is possible to lose a waste toner substantially by ******(ing) a residual toner to a development counter as other means, if there is a problem of mixture of a toner with such a method unique in the residual toner especially by secondary imprint of the above color picture formation equipments at all, it can just be going to be understood immediately for it to be unable to realize substantially.

[0019] After all, in the toner processing after a primary imprint, the waste toner processing by toner reclamation will be restricted, but also in this case, since the problem of deterioration of the toner by change of the compounding ratio by the selection imprint of the paper powder contained in the waste toner, dust, the sludge by existence of the high-pressure member in equipment, an external additive, etc. exists, a result which is satisfactory is not obtained.

[0020] What carries out reverse transcription of the residual toner of a middle imprint object to image support electrostatic, and collects these for the cleaning means for image support is proposed so that image support as shown above " drawing 3 " may see to JP,9-44007,A with one equipment, for example.

[0021] With the equipment which offered single image support, such a means can make unnecessary the cleaning means of the conveyance path of a waste toner, or a middle imprint object, and has a fixed advantage -- improvement in the ease of exchange by using image support and a cleaning means as the process cartridge of one, the sealing performance of a waste toner, and maintenance nature can be aimed at.

[0022] In fact however, with color picture formation equipment As compared with the equipment for monochrome images, the ratio of the classification of images, such as an alphabetic character, a graphic, and a photograph, changes greatly with operating conditions. By this The residual life time of image support, Big fluctuation may arise in the amount of the waste toner after it which can be held. When image support and a cleaning means were formed in a cartridge, while the life of image support remained enough, the situation where at least a waste toner reservoir became full and cartridges had to be exchanged might be caused.

[0023] This invention is made that such a situation should be coped with, and does not need a special waste toner conveyance means. While collecting the cleaning means of the whole equipment to one, making image support and a waste toner reservoir specialize further and enabling easy processing of a waste toner When especially an internal device is cartridge-ized, it aims at offering color picture formation equipment which the adjustment of the life of a waste toner processing part and the life of other members which constitute a cartridge is raised, and ** also to a cost cut.

[0024]

[Technical Means for Solving the Problem and its Function] In color picture formation equipment which this invention carries out sequential formation of each color image at image support according to two or more chrominance signals, carries out the superposition imprint of these color image at a middle imprint object, and forms a color picture in order to attain the above-mentioned purpose A toner maintenance means which carries out recovery maintenance of the residual toner which remains in said image support

temporarily, After giving a toner collected for a cleaning means to collect residual toners on said middle imprint object, and said toner maintenance means to said middle imprint object through said image support, Color picture formation equipment characterized by providing a recovery means by which said cleaning means recovers this toner (1), In a thing of the above (1) Or image support, electrification, exposure, development, Color picture formation equipment characterized by arranging a toner maintenance means for every color toner at a tandem die at each ** (2), Or a recovery roller with which it sets to the above (1) or a thing of (2), and said toner maintenance means contacts thru/or approaches with image support, By consisting of a recovery bias impression means to impress recovery bias between this roller and image support, and controlling image support surface potential and impression potential of said recovery bias impression means Color picture formation equipment characterized by performing recovery of a toner from image support, and reverse transcription of a toner to image support (3), Or a volume resistivity of a toner recovery roller consists of elastic material which is 104 - 1010- ohmcm in a thing of the above (3). Color picture formation equipment characterized by contacting image support (4), In a thing of the above (1) thru/or either of (4) or a cleaning means of said middle imprint object A recovery roller and a cleaning blade which removes a waste toner collected in contact with this roller, Color picture formation equipment characterized by consisting of a recovery bias impression means to impress recovery bias between a cleaner cartridge possessing a waste toner reservoir, and said recovery roller and said middle imprint object (5), Or in a thing of the above (5), it is color picture formation equipment and a cleaner cartridge (6) which are characterized by the ability of said cleaner cartridge to detach and attach freely on a main part of image formation equipment.

[0025] Thus, while simplifying processing of a waste toner with orientation which increases by progress of image formation equipment by constituting, when it constitutes especially in a process cartridge, it can be easy to take adjustment with a life of a waste toner processing part, and it of other members, and is very effective in a cost cut as a whole.

[0026]

[Example] " Drawing 1 " is the sectional side elevation of the color picture formation equipment in which the 1st example of this invention is shown. The image support 1 which has an axis perpendicularly in the main part of equipment at space, and carries out rotation transit in the direction of an illustration arrow head, Approach this, it is arranged in parallel and the interior of the development counters 4k, 4y, 4m, and 4c which contain a black toner, a yellow toner, a Magenta toner, and a cyanogen toner inside, respectively is carried out. The developer 5 formed free [rotation] and said image support 1 are approached so that it can move to the development part close to the sequential aforementioned image support, and the middle imprint object slack imprint belt 6 by which suspension is carried out over the roller of primary imprint roller 7 and backup roller 14 and others is arranged.

[0027] The conveyance system which conveys the imprint material 12 from the conveyance way 10 to an anchorage device 11 through a secondary imprint part with the secondary imprint roller 9 is prepared in the illustration upper part of the image support 1 at the laser scanner 3 which projects a picture signal on this, and the illustration lower part.

[0028] Since the fundamental image formation production process of this color picture formation equipment is the same as that of the case of the equipment shown above " drawing 3 ", especially the portion without a change is omitted and is explained below only about the characteristic portion of this invention. In addition, yellow, Magenta, and cyanogen each toner of the toner used for this equipment is a nonmagnetic toner, and each toner is negative electrification nature, using a magnetic toner only in a black toner.

[0029] Electrification bias impressed to the primary electrification machine 2 which electrifies uniformly the surface of the image support 1 by which a rotation drive is carried out was set to -500V. If the electrostatic latent image formed on the image support 1 arrives at a development part along with rotation transit of this image support, development counter 4k which contained the black toner by this time will have arrived at the location of illustration, a black toner will be supplied to said latent image after this, and a black toner image will be formed.

[0030] This toner image runs, if the imprint part to which the image support 1 and said imprint belt 6

contact is reached, imprint bias will be impressed to the primary imprint roller 7 which counters the image support 1 through this belt, and the black toner image on image support will be imprinted by the imprint belt 6.

[0031] the hand of cut of the image support 1 -- seeing -- the recovery roller 8 for [from said imprint part] toner recovery in the downstream -- about 110% of peripheral speed of the peripheral speed of the image support 1 -- rotating -- **** -- the bar which is not illustrated on this roller 8 -- a chair -- if recovery bias is impressed by the impression means, the residual toner on the image support 1 generated in the above-mentioned imprint production process will be transferred to said recovery roller 8, and will be removed from image support. In the case of the equipment of illustration, said recovery bias was set to direct-current +150V.

[0032] Said recovery roller 8 carries out covering formation of the EPIKURIRUHI drine compounds rubber layer which mixed carbon black to rodding, covers the fluororesin of a fluoro olefin system with a thickness of about 10 micrometers on the surface, and is the volume-resistivity value 105-106. The elastic rubber roller adjusted to omegacm was used.

[0033] In the case of the alphabetic character image image of about 6% of printing ratios, the amount of waste toners which can be stored in said recovery roller 8 can bear continuation **** of about 25 sheets by about 100 sheets and 4 color color picture.

[0034] Subsequently as for the image support 1 from which the residual toner was removed with the recovery roller 8, formation of a yellow toner image, superposition imprint to said black toner image on the imprint belt 6 of this toner image, and removal of the residual yellow toner of the image support 1 to the recovery roller 8 are performed. Succeedingly, to the imprint belt 6, the superposition imprint of a Magenta toner image and the cyanogen toner image is carried out at the above-mentioned precedence toner image, the generated residual toners are collected by the recovery roller 8, and an imprint production process is completed each time.

[0035] If the superposition toner image on the imprint belt 6 which ended the imprint production process reaches boiling at least the secondary imprint section by which the secondary imprint roller 9 has been arranged, the imprint material 12 will arrive at this imprint part by this time, and the toner image by the side of the imprint belt 6 will be imprinted by the imprint material 12 here (secondary imprint). Then, imprint material leaves an imprint part, and while fusion color mixture of the 4 color toner was carried out to the anchorage device 11 and it became a color picture very much through the conveyance way 10 at it, after fixing immobilization is carried out at imprint material, it is discharged outside the plane.

[0036] The residual toner on the imprint belt which was not transferred to imprint material at the time of a secondary imprint reaches the location of the cleaning means 13, it is removed from the imprint belt 6 by cleaning-blade 13a and cleaning-brush 13b, fall storage is carried out at waste toner bottle 13c, and the imprint belt 6 will be in the condition that it can go into the following imprint production process here. In addition, the illustration sign 14 is a roller for backing for securing a toner *** dropping operation of cleaning-blade 13a.

[0037] Next, the above-mentioned cleaning production process is explained further. After image formation production process termination, rotation of the image support 1 is continued and the image support surface is electrified in -300V with the electrification roller 2. It has a developer 5 in the non-operative location isolated from image support, and it is caused, and after at least the live part of the image support 1 reaches the recovery roller 8, the direct-current bias of -500V is impressed to this roller 8 as countertransference bias. The imprint belt 6 shall also be driven at this time.

[0038] By this, the toner by which recovery maintenance is carried out with the recovery roller 8 at the time of a primary imprint is transferred to the image support 1. The toner transferred to the image support 1 reaches the location of the primary imprint roller 7 after that, and the toner transferred to the image support 1 side from the recovery roller 8 in the operation of this imprint bias is further transferred to the imprint belt 6, and, finally is removed by the cleaning means 13.

[0039] Since the toner currently held at said recovery roller 8 passed several times the contact section with the image support 1 by which recovery bias was impressed several times into the image formation production process and is fully charged, it can transfer almost all toners to image support by impressing

reverse transcription bias. As [pollute / since this toner is removed serially and goes / moreover, / although the electrification roller 2 will be contacted by the time the toner on the recovery roller 8 moves to an imprint belt, and some toners adhere to this electrification roller 2 / the electrification roller 2]

[0040] Moreover, although it will pass through a secondary imprint part by the time the toner transferred to the imprint belt 6 reaches the cleaning means 13, contamination of the imprint roller 9 can be easily prevented by impressing sufficient negative bias (usually 2 or more Kvs) for the secondary imprint roller 9. in addition -- the case where it is the configuration that it can have the imprint roller 9 in an evacuation location, and it can be caused -- cleaning -- in process -- what is necessary is just to evacuate this

[0041] What is necessary is just to perform image formation again, after interrupting an image formation production process temporarily and carrying out a cleaning production process, in performing continuation **** which the toner to collect becomes more than the amount of toners which can be held on the recovery roller 8. Since the time amount which a cleaning production process takes is a time amount degree which prints one monochrome image, the decline in the working efficiency by this does not become a problem practically.

[0042] As explained above, according to this equipment, in the image formation equipment possessing a middle imprint object, the cleaning means for the waste toner processing generated at the time of a primary imprint and a secondary imprint can be collected to one place, without requiring a special incidental device.

[0043] Moreover, not only image support like illustration but a means for means, such as electrification in above equipment, exposure, and development, not to be limited to what was shown in above equipment, and to be able to use well-known electrification equipments, such as a SUKOTO colon, as an electrification means, for example, to support a latent image can use a sensitization belt. furthermore, cleaning -- that by which the bias impressed to electrification in process, development, a primary imprint, a secondary imprint, and a residual toner maintenance means is also limited to the above-mentioned value -- it is not -- every [for example,] color of an image -- or the thing which a thing [a thing] which pile up an image, and change the bias set point for every sequence can also carry out in arbitration within the limits of this invention -- it is not necessary to say things

[0044] " Drawing 2 " is the outline sectional side elevation showing the 2nd example of this invention, it gives the same sign to the equipment shown above " drawing 4 " and a corresponding part, is shown in them, and omits the explanation about them. Moreover, even if a difference is in a sign, as long as it is unnecessary also about especially the part that can be easily guessed about a configuration and an operation from the equipment of " drawing 4 ", explanation is omitted, and below, the characteristic portion of this invention is mainly explained.

[0045] The image formation sections P1, P2, P3, and P4 which form a respectively unique toner image in this belt transit direction of the imprint belt 19 it runs by spreading this color picture formation equipment in the shape of endless are arranged in the shape of a serial. The toner which contains each image formation section to a development counter is only unique, and a change does not have it in a fundamental configuration operation. In addition, in order to raise image grace, like the case of the above-mentioned equipment, a magnetic toner shall be used for a black toner and a nonmagnetic toner shall be used for other color toners.

[0046] Image support 15y, 15m15c, and 15k counter said each image formation section P1 thru/or P4 in the opposite side of the imprint belt 19 again at each image support, respectively, and the primary imprint rollers 20y, 20m, 20c, and 20k are arranged. Development-counter 18y which contained the yellow toner on each [said] outskirts of image support, 18m of development counters which contained the Magenta toner, development-counter which contained the cyanogen toner 18c, development-counter 18k that contained the black toner: The transfer residual toner recovery rollers 22y, 22m, 22c, and 22k are arranged in the electrification rollers 16y, 16m, 16c, and 16k and a list, respectively. The electrification bias impressed to electrification roller 16y etc. is what superimposed the alternating current on the direct current, and it is made for surface potentials, such as image support 15y, to be -

500V by this in the equipment of illustration.

[0047] It sketches about an image formation production process. The picture signal in the yellow component color of a manuscript from laser scanner 17y Of primary electrification machine 16y, it is projected by image support 15y charged uniformly, and an electrostatic latent image is formed. A yellow toner is supplied to this from development counter 18y, and it becomes a yellow toner image, and in an operation of primary imprint roller 20y, this yellow toner image is imprinted by the imprint belt 19, and runs to an image formation section P 2-way with this belt 19.

[0048] With the picture signal in the Magenta component color on which it was projected from laser scanner 17m like the above by 15m of image support by the time this yellow toner image reached the image formation section P2, the Magenta toner image by the Magenta toner is formed on 15m of image support, the superposition imprint of this Magenta toner image is carried out at said yellow toner image on the imprint belt 19, and this superposition toner image runs in the image formation section P3 direction.

[0049] The superposition imprint of the cyanogen toner image and black toner image which similarly were formed by the picture signal on which it was projected by the image support 15c and 15k from the laser scanners 17c and 17k, respectively is carried out further at said toner image on the imprint belt 19, and an imprint production process is completed.

[0050] If said superposition toner image reaches the secondary imprint part to which the secondary imprint roller 21 has been arranged with transit of the retrodisplacement copy belt 19 The imprint material 12 taken out from the cassette etc. by this time is supplied to said secondary imprint part, secondary imprint bias is impressed to the imprint roller 21 with this, and the toner image on the imprint belt 19 transfers to the imprint material 12 in an operation of the electric field therefore formed (imprint).

[0051] it dissociates from the imprint belt 19, the imprint material which has received the toner image is conveyed 11 times 4s anchorage devices on the conveyance way 10, and it is heated and pressurized here, and a toner image is discharged outside the plane, after having carried out color mixture, becoming a color picture and carrying out fixing immobilization at the imprint material 12, fusion and.

[0052] In the image formation equipment of the above-mentioned configuration, a residual toner is generated on this imprint belt also in the case of the secondary imprint which a residual toner generates on each image support in each image support 15y in the case of a primary imprint, and is imprinted from the imprint belt 19 to imprint material.

[0053] Next, processing of the above-mentioned residual toner is explained. In addition, since the configuration of each image formation section is the same, only the image formation section P1 is explained below. The residual toners on this image support 15y are collected to residual toner recovery roller 22y which is rotating in contact with image support 15y.

[0054] The thing same as recovery roller 22y as the case of said example equipment is used. Moreover, peripheral speed of this roller 22y as well as said example equipment was made into about 110% of peripheral speed to the peripheral speed of image support 15y, and the recovery bias to impress set it to +150V. The amount of recovery to recovery roller 22y of the residual toner by this also carries out continuation printing at the rate of printing 6%, and is about 100 sheets.

[0055] Recovery removal of the residual toner is carried out by recovery roller 22y, and image support 15y will be in the condition that it can go into the following image formation production process. Moreover, residual toners shall be collected by the recovery rollers 22m, 22c, and 22k by the same method also to the image support 15m, 15c, and 15k, respectively.

[0056] Moreover, cleaning equipment 23 is arranged to the part which counters the tension roller 24 located in the downstream rather than said secondary imprint part which supports the imprint belt 19. This cleaning equipment possesses recovery roller 23a which contacts the imprint belt 19, cleaning-blade 23b for failing to write a toner from this roller, and reservoir 23c which holds the waste toner which it failed to write, is formed in the cartridge of one as a whole, and can be freely detached and attached to the main part of image formation equipment.

[0057] Said recovery roller 23a is in the location backed up by said tension roller 24, it is what carried

out the covering configuration of the polycarbonate resin layer which distributed carbon on the aluminum cylinder and adjusted the volume-resistivity value to 109-1010-ohmcm, carries out synchronous transit with this in contact with the imprint belt 19, and impresses to this the voltage which superimposed the sine wave of amplitude 2Kv at the direct current voltage of +500V as recovery voltage.

[0058] Cleaning-blade 23b consisted of polyurethane rubber attached in the supporter material which consists of sheet metal, has contacted in the direction of a counter to said recovery roller 23a, writes the waste toner collected by said recovery roller 23a, and carries out fall hold at reservoir 23c.

[0059] A cleaning production process is explained. In addition, the suffix which gave the cleaning production process to the sign of each part in the following explanation since same actuation was performed in each image formation section omits. After the above-mentioned image formation production process is completed, the surface potential of the image support 15 is charged in -300V with each electrification roller 16. Exposure and development are not performed, but the direct-current bias of -500V is impressed so that the residual toner by which reverse transcription was carried out may not mix in a development counter 18, and primary imprint bias is impressed to the primary imprint roller 20.

[0060] After the portion charged in -300V on the image support 15 arrives at a contact part with the recovery roller 22, the reverse transcription bias of -500v is impressed to this roller 22. Reverse transcription of the toner by which recovery maintenance was carried out is carried out to the recovery roller 22 by this at the image support 15. This toner by which reverse transcription was carried out shall be conveyed by the image support 15, shall be imprinted by the imprint belt 19 by primary imprint bias, shall be conveyed to said cleaning means 23, and shall be removed from this belt 19 here.
 [0061] What is necessary is just to make it go into an image formation production process again, when continuation **** is performed so that it cannot hold on said recovery roller 22, after halting an image formation production process and performing a cleaning production process. In addition, with this example equipment, since only respectively single color toners are collected by each recovery roller, there is an advantage which can bear a lot of continuation **** than the above-mentioned example equipment.

[0062] Recovery roller 23a of said cleaning equipment 23 may form an about [volume-resistivity value 1013ohmcm] polycarbonate resin layer for example, not only the above-mentioned thing but on an aluminum cylinder, and it may form an electric discharge means in the downstream of a cleaning blade so that a superfluous charge may not be accumulated in a surface. Moreover, as long as the imprint belt 19 can trust insulation, a proper metal cylinder is sufficient as recovery roller 23a.

[0063] As mentioned above, according to this example equipment, the intensive processing of the waste toner generated in two or more places can be carried out at one place, and waste toner processing can be made very simple by cartridge-izing especially the cleaning section.

[Effect of the Invention] In the color picture formation equipment constituted so that this might be secondarily imprinted to imprint material after imprinting the color image according to each chrominance signal primarily on a middle imprint object when based on this invention as explained above The residual toner maintenance means which carries out recovery maintenance of the residual toner on the image support after a primary imprint temporarily, A cleaning means to remove the residual toner of the middle imprint object after a secondary imprint, Since the toners collected by said residual toner maintenance means were collected for said cleaning means through said middle imprint object It can put together to one place, without needing a complicated device. the residual toner generated in two or more places -- special -- Differentiation with the image formation section and the waste toner processing section containing image support is attained. When there is an effect remarkable in implementation of the simplicity of processing of a waste toner and it forms a cleaning means and other members in a cartridge, the place which it is easy to plan adjustment of both life, and ** to a cost cut is also size.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The outline sectional side elevation of the example slack color picture formation equipment of this invention

[Drawing 2] The outline sectional side elevation of other example slack color picture formation equipments

[Drawing 3] The outline sectional side elevation showing an example of well-known color picture formation equipment

[Drawing 4] The outline sectional side elevation showing other examples of well-known color picture formation equipment

[Description of Notations]

1 15 Image support

2 16 Electrification roller

5 18 Developer

6 19 Imprint belt (middle imprint object)

7 20 Primary imprint roller

8 22 Recovery roller

9 21 Secondary imprint roller

13 23 Cleaning equipment

[Translation done.]

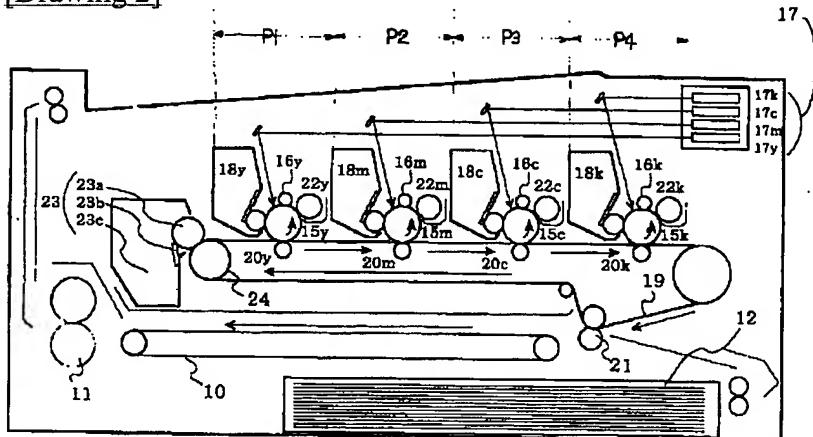
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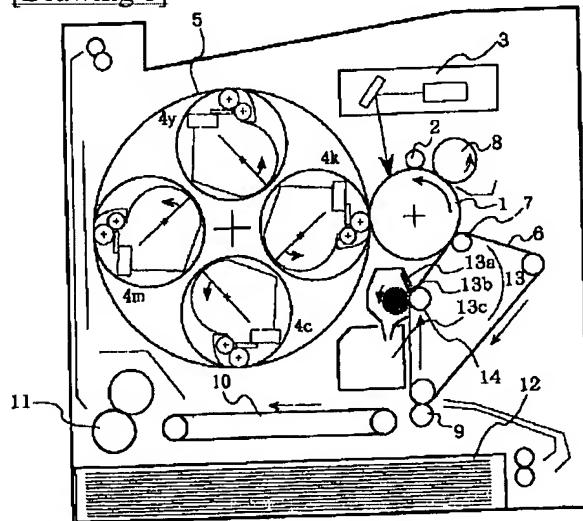
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DRAWINGS

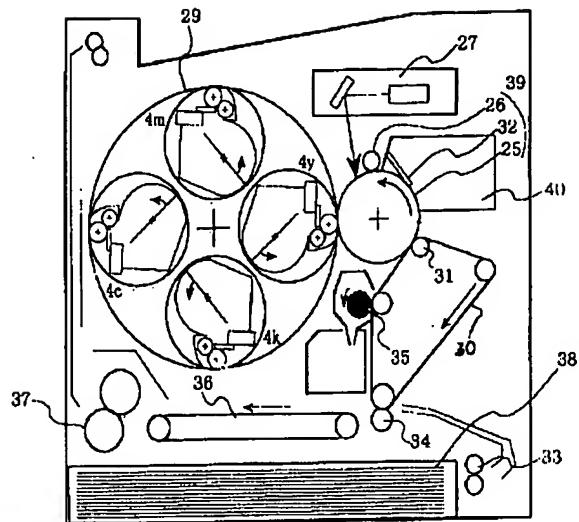
[Drawing 2]



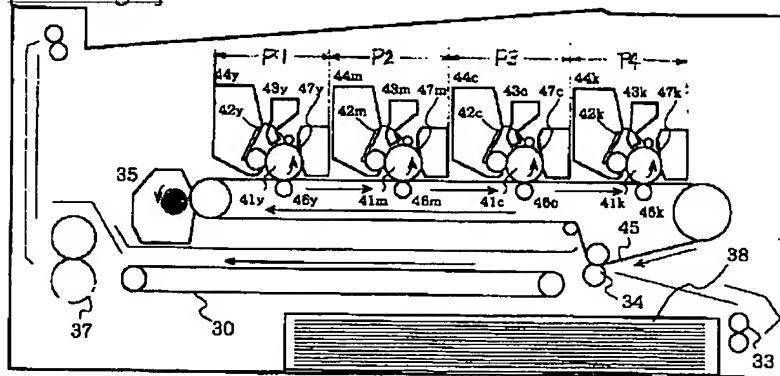
[Drawing 1]



[Drawing 3]



[Drawing 4]



[Translation done.]